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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/802,616 03/09/2001		Yatin V. Hoskote	2207/10554 7643	
7590 07/08/2004			EXAMINER	
KENYON & KENYON 1500 K Street N.W., Suite 700			FERRIS III, FRED O	
Washington, DC 20005			ART UNIT PAPER NUMBI	
5 ,			2128	

DATE MAILED: 07/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

54

Office Action Summary Examiner	-	7	Application No.	Applicant(s)	7
Period for Reply A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION. A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION. If the period for reply specified shows is best than this (30) days, a reply be timely filed and state 30(s) MONTHS from the maining date of this communication. If the period for reply specified shows is best than this (30) days, a reply within the clatified reply in a replication is the second period of the second replication. If the period for reply specified shows is best than the second reply within the clatified replication and second replication. If the period for reply specified shows is best than the second replication and second replication. If the period for reply specified shows is best than the second replication and second replication. A preparation of Claims This action is FINAL. 2b) This action is final. 2b) This action is final. 2c) This action is final. 2c) This action is final. 2d) This action is application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Exparte Quayle, 1935 C.D. 11, 453 O.G. 213. Disposition of Claims 4) Claim(s) 1-21 is/are pending in the application. 4) Claim(s) 1-21 is/are allowed. 6) Claim(s) 1-21 is/are allowed. 7) Claim(s) 1-21 is/are allowed. 8) Claim(s) 1-21 is/are allowed. 8) Claim(s) 1-21 is/are allowed. 9) The specification is objected to by the Examiner. 10) The drawing(s) filed on 190 March 2001 is/a			09/802,616	HOSKOTE ET AL.	\mathcal{A}
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DETAILED ACTION

1. Claims 1-21 have been presented for examination based on applicant's disclosure filed on 9 March 2001. Claims 1-21 have been rejected by the examiner.

Drawings

2. The drawings filed 9 March 2001 have been reviewed and approved by the examiner pending review by the draftsperson.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35

U.S.C. 102 that form the basis for the rejections under this section made in this

Office action:

A person shall be entitled to a patent unless –

- (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
- 3. Claims 1, 18, and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 6,247,163 issued to Burch et al.

Independent claims 1, 18, and 20 are drawn to:

Method for mapping state elements between first and second circuit by:
Comparing state element features (structural phase) in first circuit to second
Determining mappings between state elements in first and second circuit
Accounting for "don't care" conditions before comparing before comparing
Detecting polarity (inversion detection) of mappings
Comparing state element (functional phase) equivalence by three-valued
simulation

Determining further mappings from functional phase Detecting threshold condition for completion Regarding independent claims 1, 18, and 20: Burch discloses the elements of the claimed limitations of the present invention as follows:

- <u>Method for mapping state elements between first and second circuit</u>: Burch discloses the mapping of state (latch) elements between a first and second circuit (Abstract, Summary of Invention, CL12-L14, 44, Figs. 5-8B)
- <u>Comparing state element features (structural phase) in first circuit to second:</u>
 Burch discloses comparing (determining correspondence) between a first and second circuit (CL9-L17-CL10-L33, CL11-L3-10, 29-35, Figs. 5-8B). The examiner has interpreted this process to be functionally equivalent to the structural phase of the claimed invention that compares element features between a first and second circuit.
- <u>Determining mappings between state elements in first and second circuit</u>: Burch discloses determining mappings between state elements of a first and second circuit (CL7-L38, CL11-L35-38, Figs. 5-8B).
- <u>Accounting for "don't care" conditions before comparing before comparing:</u>

 Burch considers don't care conditions in mapping state elements (Abstract, CL2-L53, CL9-L17, Figs. 5-8B).
- <u>Detecting polarity (inversion detection) of mappings</u>: Burch discloses inversion detection of combined state element mappings (CL3-L33-CL5-L5).
- Comparing state element (functional phase) equivalence by three-valued simulation: Burch considers equivalence of three state values (CL12-L14, 44).
- <u>Determining further mappings from functional phase</u>: Burch performs further mapping after considering equivalence (CL9-L17-CL10-L33, CL11-L39-44).

 Detecting threshold condition for completion: Burch discloses a completion condition (Fig. 8B, 870).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

- 1. Determining the scope and contents of the prior art.
- 2. Ascertaining the differences between the prior art and the claims at issue.
- 3. Resolving the level of ordinary skill in the pertinent art.
- 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
- 4. Claims 1-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,247,163 issued to Burch et al in view of U.S. Patent 6,651,225 issued to Lin et al.

Regarding independent claims 1, 18, and 20: As cited previously, Burch discloses the elements of the claimed limitations of the present invention as follows:

- Method for mapping state elements between first and second circuit: Burch discloses the mapping of state (latch) elements between a first and second circuit (Abstract, Summary of Invention, CL12-L14, 44, Figs. 5-8B).
- Comparing state element features (structural phase) in first circuit to second: Burch discloses comparing (determining correspondence) between a first and second circuit (CL9-L17-CL10-L33, CL11-L3-10, 29-35, Figs. 5-8B). The examiner has interpreted this process to be functionally equivalent to the structural phase of the claimed invention that compares element features between a first and second circuit.
- <u>Determining mappings between state elements in first and second circuit</u>: Burch discloses determining mappings between state elements of a first and second circuit (CL7-L38, CL11-L35-38, Figs. 5-8B).
- Accounting for "don't care" conditions before comparing before comparing:

 Burch considers don't care conditions in mapping state elements (Abstract, CL2-L53, CL9-L17, Figs. 5-8B).
- <u>Detecting polarity (inversion detection) of mappings</u>: Burch discloses inversion detection of combined state element mappings (CL3-L33-CL5-L5).
- Comparing state element (functional phase) equivalence by three-valued simulation: Burch considers equivalence of three state values (CL12-L14, 44).

- <u>Determining further mappings from functional phase</u>: Burch performs further mapping after considering equivalence (CL9-L17-CL10-L33, CL11-L39-44).
- <u>Detecting threshold condition for completion</u>: Burch discloses a completion condition (Fig. 8B, 870).

Burch does not explicitly disclose elements relating to determining equivalence between circuits based on fan-in and fan-out (equivalence) in mapping state elements as recited in the limitations of dependent claims 2-17.

Per dependent claims 2-17, 19, and 21: Lin discloses determining fan-in and fan-out sets of combinational components (elements) that the examiner has equated to be functionally equivalent to the fan-in and fan-out signatures of the claimed invention. (Lin: CL58-L39-CL60-L13, Fig. 16) The limitations relating to parallel comparisons (claims 10, 11) are inherently disclosed by Burch since the equivalence comparisons cited above are performed between two circuits simultaneously. (Burch: CL9-L17-CL10-L33, CL11-L3-10, 29-35, Figs. 5-8B) Burch also discloses inputting random values during equivalence comparisons as recited in the limitations of claims 6, 13, 14, 19, and 21. (Burch: Abstract, Summary of Invention, Fig. 3A)

It would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to modify the teachings Burch relating to determining mappings between state elements of a first and second circuit, with the teachings of Lin relating to determining fan-in and fan-out sets of combinational components (elements), to realize the claimed invention. An obvious motivation exists since this area of technology is highly competitive with

many types of equivalence verification process available for VLSI circuit development in the market place and large amounts of money being spent in product development and improvement. (see U.S. 6,496,955 Background for example) Accordingly, a skilled artisan would have made an effort to become aware of what capabilities had already been developed in the market place and, hence, would have been motivated to modify the teachings of Burch with the teachings of Lin in order to reduce development time and cost.

Conclusion

- 5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
- U.S. Patent 6,496,955 issued to Chandra et al discloses mapping of component elements in equivalence verification.
- U.S. Patent 6,035,109 issued to Ashar et al discloses mapping of component elements in equivalence verification.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fred Ferris whose telephone number is 703-305-9670 and whose normal working hours are 8:30am to 5:00pm Monday to Friday. Any inquiry of a general nature relating to the status of this application should be directed to the group receptionist whose telephone number is 703-305-3900.

The Official Fax Numbers are:

Official

(703) 872-9306

Tred Tevris. Patent Examiner
Simulation and Emulation, Art Unit 2128
U.S. Patent and Trademark Office
Crystal Park 2, Room 5D53
Crystal City, Virginia 22202
Phone: (703) 305 - 9670
FAX: (703) 305 - 7240
Fred.Ferris@uspto.gov
June 24, 2004

Maria Maria